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Vitamin D level in children with atopic dermatitis

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ABSTRACT

Aims: Atopic dermatitis is a chronic relapsing skin disease that is mostly seen between the ages of 0-5. In our study, we aimed to reveal the difference in 25-OH vitamin D levels between the patient group diagnosed with atopic dermatitis and the control group.

Methods: It was carried out at the Pediatric Allergy Polyclinic of Balıkesir University Faculty of Medicine Hospital between 2018-2021. A control group consisting of 220 patients between the ages of 0-17 who were diagnosed with atopic dermatitis and who applied to the Pediatric Allergy outpatient clinic and 220 patients who were not diagnosed with atopic dermatitis were included. The diagnosis of atopic dermatitis was made using the Hanifin-Rajka criteria. Disease activity was measured by the scorad index.

Results: 25-OH vitamin D level and eosinophilia value in peripheral blood were found to be statistically significant between the patient and control groups. No significant difference was found between the patient and control groups in terms of parental age, parental education level, living place, weight, height, and body mass index (BMI).

Conclusion: 25-OH vitamin D levels were found to be lower and eosinophil levels were higher in patients with atopic dermatitis. No significant difference was found in terms of total IgE (kU/L) level. More extensive studies are needed to determine how 25-OH vitamin D (ng/dl) level affects atopic dermatitis.

Keywords: Pediatric, vitamin D, atopic dermatitis

INTRODUCTION

Atopic dermatitis is a recurrent, chronic and inflammatory skin disease that is mostly seen in childhood but can also affect adults.[1] Many environmental, metabolic and immunological causes are shown in the pathogenesis of atopic dermatitis. Generally, most symptoms begin within the first 5 years of age. Atopic dermatitis diagnosis is often[2] seen along with other allergic diseases such as asthma and allergic rhinitis. Its association with these diseases is approximately 50% and above.[3]

Vitamin D is a steroid hormone called cholecalciferol. Its main function is to ensure hemostasis of calcium phosphorus metabolism. It is also held responsible for many cardiovascular, neoplastic and immunological conditions. Vitamin D has 2 different synthesis pathways. It is synthesized in the skin by UVB rays from the sun or taken orally through plant (D2) and animal (D3) foods and added to the circulation. Vitamin D3 taken orally turns into 25-OH vitamin D in the liver and enters the circulation. 1,25 OH vitamin D is synthesized in the kidneys.[4-6]

METHODS

The study was carried out with the permission of the Balıkesir University Faculty of Medicine Non-invasive Clinical Research Ethics Committee (Date: 23.08.2023 Decision No: 2023/114). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

The study was conducted at the Pediatric Allergy Polyclinic of Balıkesir University Faculty of Medicine Hospital between 2018 and 2021. A control group consisting of 220 patients between the ages of 0-17 who were diagnosed with atopic dermatitis and who applied to the Pediatric Allergy outpatient clinic and 220 patients who were not diagnosed with atopic dermatitis were included. The study was planned as retrospective, cross-sectional and descriptive. Atopic dermatitis was diagnosed according to the Hanifin-Rajka criteria. The patient group diagnosed with atopic dermatitis was not receiving active steroid treatment. The patient and control groups included people who had not taken vitamin D supplements in the

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last 6 months. Physical examinations of these patients were performed and hemogram, total IgE, peripheral eosinophil count, and 25-OH vitamin D level parameters were recorded. Beckman at Balıkesir University Health Practice and Research Hospital Biochemistry Laboratory Chemiluminescence on Coulter DXI 600/800 Skin prick test was performed on the patient group diagnosed with atopic dermatitis and the control group who applied to the Pediatric Allergy and Immunology outpatient clinic. The patient group diagnosed with atopic dermatitis was evaluated with the scorad index. Scorad index: (A) extent (percentage of skin surface affected according to the rule of nine); (B) intensity (erythema, combination of edema/ papules, itching result, ooze/crust appearance, lichenification and dryness, six parameters evaluated from 0 to 3; 0: absent, 1: mild, 2: moderate, 3: severe); and (C) subjective symptoms (the severity of itching during the last three days, the effect of sleep, the effect of the general condition of the skin on daily life are questioned and the answers are evaluated from 1 to 10 and given as disease prevalence score/5+7xdisease severity score/2+patient symptoms. Scorad index was classified as mild if <25, moderate if it was 25-50, and severe disease if it was >50.7 Serum 25-OH vitamin D level of the patient and control group was classified as low if it was <20 ng/dl, medium if it was 20-30 ng/dl, >30 ng/dl is classified as high. The patient and control group reside in the same province and a similar effect is observed for sunlight exposure. The sociodemographic data of the patient and control group were asked and the occupation of the parents, education level of the parents, and place of residence were recorded.

Statistical Analyses

SPSS 23.0 package program was used for statistical analysis of the study. Descriptive statistics of continuous variables are shown with mean, standard deviation, median, minimum and maximum values, and categorical variables are shown with frequency and percentage. Suitability of continuous variables to normal distribution Shapiro It was examined with the Wilk test. One-way analysis of variance (ANOVA) was used for comparisons of normally distributed continuous variables between 3 or more groups. Mann Whitney U test was used for comparisons of variables that did not show normal distribution between 2 groups, and Kruskal Wallis test was used for comparisons of 3 or more groups. Pearson chi-square, Yates corrected chi-square and Fisher exact chi-square tests were used for group comparisons of categorical variables. In all statistical comparisons in the study, comparisons with a p value below 0.05 are considered statistically significant.

RESULTS

Among the patient and control groups included in the study, 244 were girls and 196 were boys. No significant difference was found in terms of gender. 57% of 25-OH vitamin D levels were <20 ng/dl and 32% were within the normal range (20-30 ng/dl). The average age of the groups was 5.14±3 years. No feature was detected in 71% of the groups in the skin prick test. The mean 25-OH vitamin D level was 19±8.5 ng/dl. The average total IgE value was found to be 149.6±12 kU /L (**Table 1**).

Table 1: 25-OH vitamin D distribution of patient and control groups

	25-OH vitamin D (ng/dl)			Total
	<20 ng/dl	20-30 ng/dl	>30 ng/dl	
Group				
Patient	178	28	14	220
Control	74	115	31	220
Total	252	143	45	440

Scorad index of patients with atopic dermatitis was reported as 42 mild, 106 moderate, and 72 severe. 25-OH vitamin D level and eosinophilia value in peripheral blood were found to be statistically significant. No significant difference was found between the patient and control groups in terms of parents' age, parents' education level, living place, weight, height, and body mass index (BMI) (p>0.05).

IgE level measured between the patient and control groups (p>0.05). 25-OH vitamin D levels were found to be significantly lower in patients with atopic dermatitis than in the control group (p=0.0). 65% of the control group consisted of patients diagnosed with allergic rhinitis and 30% with asthma. In our study, no significant relationship was found between 25-OH vitamin D level and scorad index (p<0.05).

Aeroallergen and food sensitivity were recorded by performing a skin prick test. No feature was detected in 71%. Pollen allergy was observed in 10%. Egg yolk positivity was the most common in the atopic dermatitis group.

Table 2: Statistical differences between the patient and control group (p<0.05*)

	Patient	Control	p
25-OH vitamin D (<20ng/dl)	178	74	0.00**
Gender			0.46
Girls	121	123	
Boy	99	97	
Height (3-25p)	83	62	0.13
Weight (3-25p)	71	68	0.78
BMI (3-25p)	72	69	0.86
Living place (city)	119	124	0.35
Eosinophil level in peripheral blood (4% -8%)	97	69	0.00**

DISCUSSION

Geographic differences play an important role in the development of all allergic diseases. In the study conducted by Lee et al.[8],it was concluded that allergic diseases develop more frequently in children living in apartments. This risk was found to be higher in atopic dermatitis. In our study, no significant difference was found between those living in urban and rural areas. This difference may be due to the fact that the study was conducted in a similar geographical region.

In our study, female gender diagnosed with atopic dermatitis was more common. This situation is compatible with the literature. 25-OH vitamin D levels were found to be lower in the atopic dermatitis group compared to other allergic diseases. In the study conducted by Çiçek et al.[9] 25-OH vitamin D levels were found to be significantly low in patients with atopic dermatitis, similar to our study. Again, in this study, eosinophil levels were found to be high, similar to our study, but no significant relationship was found between specific IgE levels.

In the study conducted by Raj et al.[3] no significant difference was found in the 25-OH vitamin D level in patients with atopic dermatitis, but the Scorad Index difference was measured between before and after vitamin D treatment, and 4.8 weeks and final measurements were made and a significant decrease in the Scorad index was observed. Vitamin D treatment is thought to directly increase the production of peptides with antimicrobial activity, such as cathecesins, in the skin. They suggested that corticosteroids used in the treatment of[10] atopic dermatitis reduce vitamin D synthesis.

CONCLUSION

We concluded that 25-OH vitamin D level is more important in atopic dermatitis compared to other allergic diseases. However, larger studies are needed to determine the effects of vitamin D.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Balıkesir University Faculty of Medicine Non-invasive Clinical Research Ethics Committee (Date: 23.08.2023 Decision No: 2023/114).

Informed Consent

Since the study was designed retrospectively, no written informed consent forms were obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study had no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

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